**TABLE 7**
**RECOMMENDED AND ADOPTED FISH/SHELLFISH CONSUMPTION RATES ***

| Chemical | EPA Recommended Fish Consumption Rate (g/day) | FDEP Adopted Fish Consumption Rate (g/day) |
|---|---|---|
| 1,1,1-Trichloroethane<br>71556 | 22 | |
| 1,1,2,2-Tetrachloroethane<br>79345 | 22 | 6.5 |
| 1,1,2-Trichloroethane<br>79005 | 22 | |
| 1,1-Dichloroethylene<br>75354 | 22 | 6.5 |
| 1,2,4-Trichlorobenzene<br>120821 | 22 | |
| 1,2-Dichlorobenzene<br>95501 | 22 | |
| 1,2-Dichloroethane<br>107062 | 22 | |
| 1,2-Dichloropropane<br>78875 | 22 | |
| 1,2-Diphenylhydrazine<br>122667 | 22 | |
| 1,3-Dichlorobenzene<br>541731 | 22 | |
| 1,3-Dichloropropene<br>542756 | 22 | |
| 1,4-Dichlorobenzene<br>106467 | 22 | |
| 2,3,7,8-TCDD (Dioxin)<br>1746016 | 17.5 | |
| 2,4,6-Trichlorophenol<br>88062 | 22 | 6.5 |

| Chemical | EPA Recommended Fish Consumption Rate (g/day) | FDEP Adopted Fish Consumption Rate (g/day) |
|---|---|---|
| 2,4-Dichlorophenol<br>120832 | 22 | 6.5 |
| 2,4-Dimethylphenol<br>105679 | 22 | |
| 2,4-Dinitrophenol<br>51285 | 22 | 6.5 |
| 2,4-Dinitrotoluene<br>121142 | 22 | 6.5 |
| 2-Chloronaphthalene<br>91587 | 22 | |
| 2-Chlorophenol<br>95578 | 22 | 6.5 |
| 2-Methyl-4,6-Dinitrophenol<br>534521 | 22 | |
| 3,3'-Dichlorobenzidine<br>91941 | 22 | |
| 3-Methyl-4-Chlorophenol<br>59507 | 22 | |
| Acenaphthene<br>83329 | 22 | 6.5 |
| Acrolein<br>107028 | 22 | |
| Acrylonitrile<br>107131 | 22 | |
| Aldrin<br>309002 | 22 | 6.5 |
| alpha-Hexachlorocyclohexane (HCH)<br>319846 | 22 | |
| alpha-Endosulfan<br>959988 | 22 | |

| Chemical | EPA Recommended Fish Consumption Rate (g/day) | FDEP Adopted Fish Consumption Rate (g/day) |
|---|---|---|
| Anthracene<br>120127 | 22 | 6.5 |
| Antimony<br>7440360 | 17.5 | 6.5 |
| Arsenic<br>7440382 | 6.5 | |
| Asbestos<br>1332214 | | |
| Benzene<br>71432 | 22 | 6.5 |
| Benzidine<br>92875 | 22 | |
| Benzo(a)anthracene<br>56553 | 22 | |
| Benzo(a)pyrene<br>50328 | 22 | |
| Benzo(b)fluoranthene<br>205992 | 22 | |
| Benzo(k)fluoranthene<br>207089 | 22 | |
| beta-Hexachlorocyclohexane (HCH)<br>319857 | 22 | 6.5 |
| beta-Endosulfan<br>33213659 | 22 | |
| Bis(2-Chloro-1-methylethyl) Ether<br>108601 | 22 | |
| Bis(2-Chloroethyl) Ether<br>111444 | 22 | |
| Bis(2-Ethylhexyl) Phthalate<br>117817 | 22 | |

| Chemical | EPA Recommended Fish Consumption Rate (g/day) | FDEP Adopted Fish Consumption Rate (g/day) |
|---|---|---|
| Bromoform<br>75252 | 22 | 6.5 |
| Butylbenzyl Phthalate<br>85687 | 22 | |
| Carbon Tetrachloride<br>56235 | 22 | 6.5 |
| Chlordane<br>57749 | 22 | 6.5 |
| Chlorobenzene<br>108907 | 22 | |
| Chlorodibromomethane<br>124481 | 22 | 6.5 |
| Chloroform<br>67663 | 22 | 6.5 |
| Chrysene<br>218019 | 22 | |
| Copper<br>7440508 | | |
| Cyanide<br>57125 | 22 | |
| Dibenzo(a,h)anthracene<br>53703 | 22 | |
| Dichlorobromomethane<br>75274 | 22 | 6.5 |
| Dieldrin<br>60571 | 22 | 6.5 |
| Diethyl Pthalate<br>84662 | 22 | |
| Dimethyl Phthalate<br>131113 | 22 | |

| Chemical | EPA Recommended Fish Consumption Rate (g/day) | FDEP Adopted Fish Consumption Rate (g/day) |
|---|---|---|
| Di-n-Butyl Phthalate<br>84742 | 22 | |
| Endosulfan Sulfate<br>1031078 | 22 | |
| Endrin<br>72208 | 22 | |
| Endrin Adehyde<br>7421934 | 22 | |
| Ethylbenzene<br>100414 | 22 | |
| Fluoranthene<br>206440 | 22 | 6.5 |
| Fluorene<br>86737 | 22 | 6.5 |
| gamma-Hexachlorocyclohexane (HCH) [Lindane]<br>58899 | 22 | 6.5 |
| Heptachlor<br>76448 | 22 | 6.5 |
| Heptahlor Epoxide<br>1024573 | 22 | |
| Hexachloroenzene<br>118741 | 22 | |
| Hexachlorobutadiene<br>87683 | 22 | 6.5 |
| Hexachlorocyclopentadiene<br>77474 | 22 | |
| Hexachloroethane<br>67721 | 22 | |
| Indeno(1,2,3-cd)pyrene<br>193395 | 22 | |

| Chemical | EPA Recommended Fish Consumption Rate (g/day) | FDEP Adopted Fish Consumption Rate (g/day) |
|---|---|---|
| Isophorone<br>78591 | 22 | |
| Methylmercury<br>22967926 | 17.5 | |
| Methyl Bromide<br>74839 | 22 | |
| Methylene Chloride<br>75092 | 22 | 6.5 |
| Nickel<br>744000 | 6.5 | |
| Nitrobenzene<br>98953 | 22 | |
| N-Nitrosodimethylamine<br>62759 | 17.5 | |
| N-Nitrosodi-n-Propylamine<br>621647 | 17.5 | |
| N-Nitrosodiphenylamine<br>86306 | 17.5 | |
| Pentachlorophenol<br>87865 | 22 | 6.5 |
| Phenol<br>108952 | 22 | |
| p,p'-Dichlorodiphenyldichloroethane (DDD)<br>72548 | 22 | |
| p,p<br>-Dichlorodiphenyldichloroethylene (DDE)<br>72559 | 22 | |

| Chemical | EPA Recommended Fish Consumption Rate (g/day) | FDEP Adopted Fish Consumption Rate (g/day) |
|---|---|---|
| p,p'-Dichlorodiphenyltrichloroethane (DDT)<br>50293 | 22 | 6.5 |
| Polychlorinated Biphenyls (PCBs)<br>1336363 | 17.5 | 6.5 |
| Pyrene<br>129000 | 22 | 6.5 |
| Selenium<br>7782492 | 17.5 | |
| Tetrachloroethylene<br>127184 | 22 | 6.5 |
| Thallium<br>7440280 | 17.5 | 6.5 |
| Toluene<br>108883 | 22 | |
| Toxaphene<br>8001352 | 22 | |
| trans-1,2-Dichloroethylene<br>156605 | 22 | |
| Trichloroethylene<br>79016 | 22 | 6.5 |
| Vinyl Chloride<br>75014 | 22 | |
| Zinc<br>7440666 | 17.5 | |

*** Summary:**

Table 7 identifies the fish/shellfish consumption rates used by EPA to calculate national recommended water quality criteria for 97 toxic pollutants to protect human health and by FDEP to calculate adopted water quality criteria for 32 toxic pollutants to protect human health. The former are based on individual water quality criteria documents for toxic

pollutants hyperlinked in *National Recommended Water Quality Criteria - Human Health Criteria Table*, https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table (accessed Dec. 31, 2021). The latter are based on electronic mail from Kaitlyn Sutton, Environmental Administrator, Water Quality Standards Development Section, Division of Environmental Assessment and Restoration, FDEP, to David A. Ludder, Law Office of David A. Ludder, PLLC (dated Aug. 30, 2021) and Fla. Admin. Code r. 62-302.530, Table: Surface Water Quality Criteria (indicating that no criteria have been adopted for 3,3'-Dichlorobenzidine, Acrylonitrile, and gamma-Hexachlorocyclohexane (HCH) [Lindane], among others).

FDEP has not adopted water quality criteria to protect human health for 65 toxic pollutants. As discussed below, FDEP's adoption and use of a fish consumption rate of 6.5 grams per day underestimates human consumption of fish and shellfish and underestimates human exposure to toxic pollutants.

**Comments:**

Human exposure to toxic pollutants in water is primarily through consumption of contaminated water and contaminated aquatic organisms (fish and shellfish). Aquatic organisms become contaminated when they ingest and accumulate toxic pollutants. The magnitude of human exposure to contaminated aquatic organisms is a function of the amount of human consumption of contaminated aquatic organisms.

In November 1980, EPA recommended a national fish/shellfish consumption rate of 6.5 grams per day based on an analysis of the National Purchase Diary Fish Consumption Survey conducted by NPD Research, Inc. in 1973-74 for the Tuna Research Institute. *Seafood consumption data analysis, Stanford Research Institute International, Menlo Park, California, Final report, Task 11, Contract No. 08-01-3887* (1980); *Guidelines and Methodology Used in the Preparation of Health Effects Assessment Chapters of the Consent Decree Water Criteria Documents*, 45 Fed. Reg. 79347, 79324, 79348 (Nov. 28, 1980); *Exposure Factors Handbook* (EPA/600/8-89/043, March 1990), at 2-28 & 2-31.

In October 2000, EPA revised its national recommended fish/shellfish consumption rate to 17.5 grams per day based on the *1994–1996 Continuing Survey of Food Intakes by Individuals and 1994–1996 Diet and Health Knowledge Survey* (USDA, 1998); *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (EPA-822-B-00-004, Oct. 2000), at 4-25. See 65 Fed. Reg. 66444, 66452 (Nov. 3, 2000).

In April 2014, EPA revised its national recommended fish/shellfish consumption rate to 22 grams per day based on an analysis of NHANES data from 2003 to 2010. *Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations (NHANES 2003-2010)* (EPA-820-R-14-002, Apr. 2014), at Table 9b; 80 Fed. Reg. 36986 (June 29, 2015).

In *Human Health Ambient Water Quality Criteria: 2015 Update* (EPA 820-F-15-001 June 2015), EPA reported:

> **Fish Consumption**
>
> EPA updated the default fish consumption rate to 22 grams per day. This rate represents the 90th percentile consumption rate of fish and shellfish from inland and nearshore waters for the U.S. adult population 21 years of age and older, based on NHANES data from 2003 to 2010 (USEPA 2014). EPA's previously recommended rate of 17.5 grams per day was based on the 90th percentile consumption rate of fish and shellfish from inland and nearshore waters for the U.S. adult population and was derived from 1994-1996 CSFII data.
>
> As described in EPA's human health criteria methodology (USEPA 2000), the level of fish consumption in highly exposed populations varies by geographical location. Therefore, EPA suggests a four preference hierarchy for states and authorized tribes that encourages use of the best local, state, or regional data available to derive fish consumption rates. EPA recommends that states and authorized tribes consider developing criteria to protect highly exposed population groups and use local or regional data in place of a default value as more representative of their target population group(s). The preferred hierarchy is: (1) use of local data; (2) use of data reflecting similar geography/ population groups; (3) use of data from national surveys; and (4) use of EPA's default consumption rates.

*Id.* (citing *Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations (NHANES 2003-2010)* (EPA-820-R-14-002, Apr. 2014), at Table 9b; *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (EPA-822-B-00-004, Oct. 2000), at 4-25).

On August 31, 1994, the Florida Agricultural Market Research Center at the University of Florida published the results of a 7-day recall survey performed between March 15, 1993 and

March 13, 1994. The study was commissioned by the Florida Department of Environmental Protection in 1992. The fish consumption habits of three survey populations were examined: the general population across the state; the general population communities where paper mills are located; and households receiving food stamps. *Per Capita Fish and Shellfish Consumption in Florida, Industry Report 94-2* (Univ. of Fla. Agric. and Mkt. Research Ctr., Aug. 31, 1994). The mean finfish and shellfish consumption for the general population was reported as 46.0 grams per day.

The data collected for *Per Capita Fish and Shellfish Consumption in Florida, Industry Report 94-2* (Univ. of Fla. Agric. and Mkt. Research Ctr., Aug. 31, 1994) were further analyzed by the University of Florida Center for Environmental & Human Toxicology to generate the fish consumption rate distributions reported in *Final Baseline Risk Analysis for Chapter 62-302, F.A.C.* (Univ. of Fla. Ctr. for Envt'l & Human Toxicology, May 2008), at Table 10. This analysis indicates that the 90th percentile distribution for consumers and non-consumers of Florida fish species (freshwater fish and marine species known to occur in nearshore waters off Florida) was 63.5 g/day.

The data collected for *Per Capita Fish and Shellfish Consumption in Florida, Industry Report 94-2* were analyzed by the EPA to generate the fish consumption rate distributions reported in *Fish Consumption in Connecticut, Florida, Minnesota, and North Dakota* (EPA/600/R-13/098F, Aug. 2013). This analysis indicates that the 90th percentile distribution of per capita consumption of freshwater and estuarine fish (uncooked) was 28 grams per day. *Id.,* at Table E-96. However, EPA repeatedly cautioned that the manner in which the data were collected made it likely to underestimate consumption. *E.g., id.*, at 3-25 ("The Florida survey collected away-from-home fish consumption for the randomly selected adult respondent, but not for other adults in the household and not for children. As a result, the estimated per capita fish and shellfish consumption in Florida is likely to underestimate the true amount."). *See id.,* at ES-3, 1-5, 3-6, 3-22, and A-2.

An EPA analysis of NHANES data from 2003-2010 determined that the 90$^{th}$ percentile consumption rates of freshwater and estuarine finfish and shellfish for the Gulf of Mexico and Atlantic coastal/inland regions were 28.6 g/day and 30.8 g/day, respectively. *Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations (NHANES 2003-2010)* (EPA-820-R-14-002, April 2014), at Table 9b.